



Pongamia pinnata (L.) Pierre

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Pongamia pinnata (L.) Pierre

Taxonomy and nomenclature

Species name: *Pongamia pinnata* (L.) Pierre

Family: Fabaceae

Synonym(s): *Pongamia glabra* Vent., *Derris indica* (Lam.) Benn., *Millettia pinnata* (L.) Panigrahi

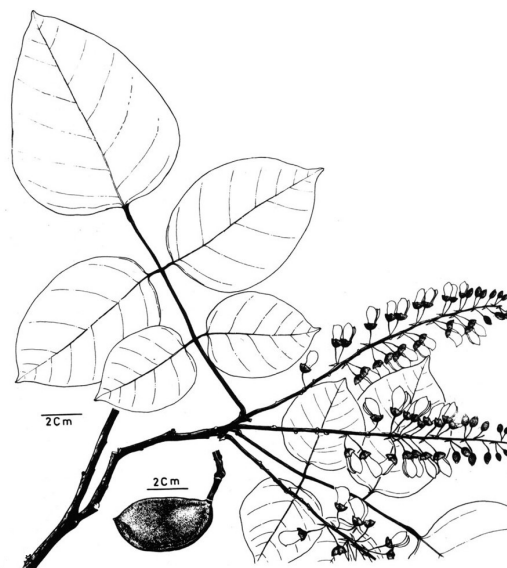
Vernacular/Common name: Karanj, Pongam (India), Karum tree, Indian beech (English), Thiuvia (Burmese), Paripari, Malapari (Malay), Bangkong (Javanese), Kanji, pongam, karanga, karanj (Trade name).

Distribution and habitat

The species is considered to be a native of Western Ghats of India. It is introduced into cultivation to other parts of India, China, Japan, Thailand, Malaysia and some pacific islands chiefly in the littoral regions of south-eastern Asia and Australia. It can grow in vast variety of ecological conditions including saline, alkaline black soil (including vertisols), waterlogged or sandy soil, lowland forests on limestone, rocky coral outcrops of the coast, mangrove forests along tidal streams and rivers and also in the plain lands, but better growth is seen in deep well drained moist sandy loam soil. It occurs up to an elevation at 1200m. The range of temperature of its habitat is 0-50°C and rainfall is 500-2500 mm. The tree is drought resistant, slightly frost hardy and highly tolerant of salinity. It is shade-bearer and is considered to be a good tree for planting in pastures, as grass grows well in the shade. However it cannot resist prolonged drought. The trees require a dry season of 2-6 months.

Use

Wood is moderately strong, tough, but needs water seasoning for prevention of insect attack. It is used locally for agricultural implements, such as ploughs, yokes etc., cartwheels, oil mills rafters post, cabinets, tools, etc. It is also a good source of fuel wood. The oil produced from the seeds is known as pongam oil that has many industrial and medicinal uses. The seeds contain 27-39 percent of fatty oil, which is used for leather dressing, soap making, lubrication and illumination. It is also used for treatment of scabies, herpes, leucoderma and other skin diseases. Roots, bark, leaves and flowers are used as local medicines. The seed oil is also used in villages as biodiesel to run generators for electricity. The seed cake is used as manure and as pesticide. The leaves are used as fodder and also as green manure for rice and sugarcane fields. Flowers are considered as good source of pollen and nectar for honeybees. The tree is a host of lac insect and for the



hemi parasitic sandalwood, *Santalum album*. It is used as road-side plantation and for afforestation especially in water shed wastelands, lateritic soil, mined out areas, coal mine spoils and brackish water and inundated areas.

Botanical description

Pongamia pinnata is a medium sized nearly evergreen or briefly deciduous glabrous tree with short and crooked bole and spreading shady crown reaching a height of 15-25m. Bark is greyish green or brown, smooth or covered with tubercles. Leaves alternate, imparipinnate with long slender leafstalk, hairless, pinkish-red when young, glossy dark green above and dull green with prominent veins beneath when mature. Leaflets 2-4 pairs plus terminal leaflet, short-stalked, ovate elliptical or oblong, 5-25 cm long and 2.5-15 cm wide; base abruptly acuminate, rounded to cuneate, margins entire, slightly thickened, bright glossy above, prominent veins underneath. Inflorescence raceme-like, axillary, 6-27 cm long, bearing pairs of strongly fragrant flowers. Flowers are clustered (2-4 together), short-stalked 15-18 mm long. Calyx campanulate, 4-5 mm long, truncate, finely pubescent; corolla white to pink, purple inside, brownish veined outside, 5-toothed, standard rounded obovate 1-2 cm long, with basal auricles, often with green central blotch and thin silky hairs on back; wings oblong, oblique, slightly adherent to obtuse keel.

Fruit and seed description

Fruit: Pods variable in size and shape. Short-stalked, el-

lentic to obliquely oblong 4.0 to 7.5 cm long and 1.5-3.2 cm broad, yellowish grey when ripe, flattened but slightly swollen, slightly curved, compressed with a short curved beak, brown, thick-walled, leathery to sub-woody, hard, indehiscent, 1-2 seeded. 460-530 dry pods per kg.

Seeds: Seed compressed, elliptical or reniform, 1.7-3.0 cm long and 1.2-1.8 cm broad, flattened, oily, wrinkled with reddish brown, brittle, leathery testa. Seed weight exhibits very large variation which may relate to individual or provenance variation. Some data indicates seed weight 810-1410 seeds per kg; others have 1000 pure-seed-weight about 1650 -1900g, which is equivalent to mere 530 - 600 seeds per kg.

Flowering and fruiting habits

The tree starts bearing at the age of 4-7 years. The flowering and fruiting time varies in different region. Usually flowers appear in April-July and pods ripen from December to June. The yield of seed may range from 9 to 90 kg tree. Pods need to decompose before the seeds can germinate. Herbivores do not like the seeds. In riverside and coastal habitats, the pods are dispersed by flowing water.

Seed collection

Mature pods are collected when the pods turn greenish brown and seeds are light brown with 20-25% moisture content. Collection by spreading is a tarpaulin under the tree, shaking the tree or looping the branches or plucking the pods. Seeds are extracted from pods by light hammering or pressing a knife along the sutures to break them open. Seeds are spread in one layer on cement floor and dried in shade with proper aeration till the moisture content of seed has reduced to 4-6%.

Dormancy and pretreatment

Seeds have no dormancy, so pre-sowing treatment is not required. However seeds can be soaked in water for 24 hrs before sowing to hasten germination. Germination of fresh seeds is 75 to 80 percent.

Storage and viability

Pongamia pinnata seeds are orthodox. Seed can tolerate 4-5% mc and freezing temp at low mc. Seeds can maintain high viability for about five years at ambient temperature (15-35°C) and mc 4-5%. Lowering the storage temperature extends viability. Seeds can be treated with Bavistin 0.2% to prevent fungal attack during storage.



Sowing and germination

Sowing preferably in the beginning of hot season. Seeds start germination after about 10 days and complete in about a month. Seedlings with 2 pairs of leaves are pricked out in polythene bags in the evening and should be watered profusely. Seedlings attaining about 60 cm by the beginning of the next rainy season are transplanted in the field at a spacing of 3x3 m in pits of approximately 30x30x30 cm.

Phytosanitary problems

The important pests of this species are *Parnara mathias*, *Gracillaria* spp, *Indarbela quadrinotata*, *Mylokerus curvicornis*, and *Acrocercops* spp. Attacks by these insects cause whitish streaks and the formation of galls on affected leaves. *Aspongopus brunneus* has been found to cause 20-30% damage to nursery seedlings in India. Both adults as well as nymphs suck the sap from the seedlings. Several fungi attack the seedlings and the trees. *Ganoderma lucidum* causes root rot and *Fomes merilli* attack the tender shoots and leaves and cause early defoliation in the seedlings and trees. Poor storage conditions implies a risk of fungal infection e.g. by *Aspergillus* spp, *Penicillium* spp, *Chaetomium* spp and *Dothiorella* spp. *Phyllachora pongamia* and *Ravenelia hobsoni* cause leaf-tar spot and rust respectively.

Selected readings

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